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PATENT

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Washington, D.C. 20231

Date: August 31, 2000
File No.: 2648.63638

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): Jian-Shiou Liaw

For: CUTTING TOOL ADOPTED FOR TWO
HANDED OPERATION

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Enclosed are:

- (X) 12 pages of specification, including 15 claims and an abstract.
(X) an executed oath or declaration, with power of attorney.
() an unexecuted oath or declaration, with power of attorney.
() sheet(s) of informal drawing(s).
(X) 3 sheet(s) of formal drawings(s).
(X) 2 Assignment(s) of the invention to K.K.U. Limited.
(X) 2 Assignment Form Cover Sheet.
(X) A check in the amount of \$ 80.00 to cover the fee for recording the assignment(s).
() Information Disclosure Statement.
() Form PTO-1449 and cited references.
() Associate Power of Attorney.
(X) Priority Document.

Fee Calculation For Claims As Filed

a) Basic Fee						\$ 690.00
b) Independent Claims	<u>2</u>	-	<u>3</u>	=	<u>0</u>	x \$ 78.00 = \$ <u>0</u>
c) Total Claims	<u>15</u>	-	<u>20</u>	=	<u>0</u>	x \$ 18.00 = \$ <u>0</u>
d) Fee for Multiple Claims						\$260.00 = \$ <u> </u>
Total Filing Fee						\$ <u>690.00</u>

- (X) 1 Statement(s) of Status as Small Entity, reducing filing fee in half to \$ 345.00
(X) A check in the amount of \$ 345.00 to cover the filing fee is enclosed.
() Charge \$ to Deposit Account No. 07-2069.
() Other
(X) The Commissioner is hereby authorized to charge any additional fees which may be required to this application under 37 C.F.R. §§1.16-1.17, or credit any overpayment, to Deposit Account No. 07-2069. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 07-2069. Two duplicate copies of this sheet are enclosed.

Suite 8660 - Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606
(312) 993-0080

GREER, BURNS & CRAIN, LTD.

By: 

Patrick G. Burns

Registration No. 29,367

ADM049/1097

09632268 083100

08/31/00

JC821 U.S. PTO

JC836 U.S. PTO
09/652268
08/31/00

Applicant or Patentee: Jian-Shiou Liaw
Serial or Patent No.: _____
Filed or Issued: _____
For: CUTTING TOOL ADOPTED FOR TWO HANDED OPERATION

Atty Docket No. 2648.63638

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) AND 1.27(c) - SMALL BUSINESS CONCERN)

I hereby declare that I am

- () the owner of the small business concern identified below:
(X) an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: K.K.U. Limited
ADDRESS OF CONCERN: 1-1-32 Shibadaimon Minato-Ku, Tokyo 105, Japan

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time, or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled:

CUTTING TOOL ADOPTED FOR TWO HANDED OPERATION

by inventor(s): Jian-Shiou Liaw
described in:

- (X) the specification filed herewith.
() application serial no. _____, filed _____.
() patent no. _____, issued _____.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern, or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e). *NOTE: Separate verified statements are required from each named person, concern, or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

NAME _____

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I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: Takenito Katsumura
TITLE OF PERSON OTHER THAN OWNER: President
ADDRESS OF PERSON SIGNING: 1-1-32 Shibadaimon Minato-Ku, Tokyo 105, Japan

SIGNATURE: _____

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CUTTING TOOL ADOPTED FOR TWO HANDED OPERATION

FIELD OF THE INVENTION

The present invention relates generally to a pneumatic tool, and more particularly to a pneumatic cutting tool adapted for two handed operation.

BACKGROUND OF THE INVENTION

A conventional pneumatic cutting tool is shown in FIG. 3, and generally includes a body 60 housing a motor (not illustrated) which drives a shaft 61. A protecting cover 65 is provided at an operating end 80 of the body 60. A connecting tube 67 is further provided with one end connected to the shaft 61. A relatively larger positioning collar 68 is defined on the connecting tube 67. The positioning collar 68 has a protrusion part 69, with inner thread 70, where a bolt 72 attaches a circular cutter 71 to the connecting tube 67. In operation, the motor drives the shaft 61, connecting tube 67 and the cutter 71, to rotate the cutter and perform the operation of cutting.

The conventional cutting tool provides convenient one-handed operation, but does not permit operation using two hands. However, one-handed operation is problematic as it easily affects the quality of work performed by the tool. Specifically, it is difficult to control vibrations of the tool, and consequently the precise shape of the article being cut. Moreover, single-handed operation is strenuous, which leads to operator

fatigue. In addition to affecting the quality of work, there is a risk that the pneumatic cutting tool will slip out of the operator's single hand, which could have undesired consequences.

Accordingly, one object of the present invention is to provide an improved pneumatic cutting tool that can be gripped with both of the operator's hands to provide greater stability, and to eliminate the above-mentioned disadvantages.

Another object of the present invention is to provide an adjustable handle for a cutting tool, enabling convenient gripping of the tool in a plurality of positions.

SUMMARY OF THE INVENTION

The above-listed objects are met or exceeded by the present invention, in which a cutting tool has an extended length facilitating two-handed gripping of the tool. This results in greater stability during the operation of the tool, and facilitates the cutting operation.

A first objective of the present invention is to provide a cutting tool having an extended length. The length of the cutting tool is suitably configured to conveniently allow two handed support of the cutting tool during operation, providing better stability and control in cutting.

Another objective of the present invention is to provide a pneumatic cutting tool having an adjustable handle for accommodating the preferred positions of various operators using the tool.

More specifically, the present invention provides a pneumatic cutting tool

having an extended length, including a body which has an opening defined therein, and a shaft rotatably mounted to and extended out of the opening of the body. A first connecting tube is connected to the shaft at one end and an extension rod is connected to the other end of the first connecting tube. One end of a cylinder is connected to the opening of the body at the opening, and a protecting cover is fitted on the other end of the cylinder. The extension rod is rotatably fitted inside the cylinder. A second connecting tube is connected to the other end of the extension rod, and to a positioning collar. A circular cutter is fitted onto the positioning collar.

According to one embodiment, the pneumatic cutting tool has a handle assembly which includes a rotatable tube having a handle attached that is slidably mounted onto the periphery of the cylinder. The position of the handle can be adjusted by loosening a threaded rod and moving the rotatable tube along the cylinder.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be more clearly understood from the description as set forth below with reference to the accompanying drawings, wherein:

FIG. 1 is an exploded perspective view of a pneumatic cutting tool in accordance with the present invention;

FIG. 2 is a partial side view of the pneumatic cutting tool of FIG. 1, shown in partial cross-section; and

FIG. 3 is an exploded perspective view of a conventional pneumatic cutting tool.

DETAILED DESCRIPTION OF THE INVENTION

As shown in FIGS. 1 and 2, a pneumatic cutting tool includes a body 10 having a trigger 11 extending from it, and an opening 10a defined therein. The inner wall of the opening 10a has an inner thread 13. A shaft 12 extends out of the body 10 through the opening 10a, and is connected to a connecting tube 20. The body 10 also houses a motor, which rotates the shaft 12.

According to a preferred embodiment, the connecting tube 20 is screwed onto a threaded portion of the axle 12. An extension rod 21 is then connected to the connecting tube 20. Ends 21a and 21b of the extension rod 21 are each provided with a bearing 22.

A cylinder 30 which is long enough to grasp in a hand, has a body end 38 and an operating end 39. The body end 38 is connected to the body 10. According to a preferred embodiment, the body end 38 engages the inner thread 13 of the body 10.

The cylinder 30 has a through hole 31 (FIG. 2) which receives the connecting tube 20 and the extension rod 21. The through hole 31 can have two parts 31a and 31b which respectively receive the connecting tube 20 and the extension rod 21. The through hole 31 also has parts 31c which allow the two bearings 22 to support the extension rod 21 in the through hole 31 of the cylinder 30. According to a preferred embodiment, through hole part 31a has a greater diameter than through hole part 31b.

In addition, the outer periphery of the cylinder 30 at its body end 38 has many facets 32 formed thereon and a tapered part 33 surrounding the facets 32, such that

the cylinder 30 can be easily attached to or detached from the body 10 using a wrench or the like.

The outer periphery of the cylinder 30 has an outer thread 34 defined on the operating end 39. A circular radial surface 35 is formed at the operating end 39 proximate the outer thread 34. Two facets 36 are formed in the outer thread 34 in a facing relationship to one another.

According to a further aspect of the preferred embodiment, a handle assembly including a rotatable tube 40 and a handle 43 is slidably mounted on the cylinder 30. Preferably, the rotatable tube 40 has a threaded hole 41 configured to receive a threaded rod 42. The handle 43 is connected to the threaded rod 42. Thus, the threaded rod 42 secures the handle 43 to the rotatable tube 40. The threaded rod 42 extends through the threaded hole 41 when the handle is tightened, to fix the rotatable tube 40 in a given position.

A cutting mechanism 5 includes a protecting cover 50 which slips over the outer thread 34 to abut the radial surface 35 of the cylinder 30. A nut 51 fixedly locks the protecting cover 50 onto the cylinder 30. A connecting tube 52 is provided with a positioning collar 53 on one end and two facets 54 on the other end. An inner thread 55 is defined inside the connecting tube 52 near the facets 54, and is configured to engage end 21b of the extension rod 21.

A protrusion part 56 of the connecting tube 52 is provided with an inner thread hole 57 located in the central part thereof. A circular cutter 58 has a central opening to allow itself to fit around the periphery of the protrusion part 56. A bolt 59 is

provided to pass through a washer 59a and screw into the central thread part 57 of the protrusion part 56, such that the washer 59a is allowed to lock the circular cutter 58 onto the connecting tube 52.

Referring once again to FIGS. 1 and 2, according to the preferred working position of an operator, the handle 43 can be moved to a suitable location along the outer periphery of the cylinder 30. Loosening the handle 43 disengages the threaded rod 42 from the outer periphery of the cylinder 30, permitting the rotatable tube 40 to be freely moved to a desired axial and radial position on the cylinder 30. Then, tightening the handle 43 engages the threaded rod 42 with the outer periphery of the cylinder 30, which fixes the handle 43 in the desired position.

In operation, the trigger 11 commences the motor to drive the shaft 12 together with the extension rod 21, such that the extension rod 21 can simultaneously drive the connecting tube 52 to drive the circular cutter 58 to rotate and perform the cutting operation. Only one hand is required to actuate the trigger 11, while the other hand grips the handle 43. By using two hands for the cutting operation of the pneumatic cutting tool in accordance with the present invention, the cutting forces and vibrations are effectively diminished, resulting in higher efficiency and stability of the cutting operation.

In another embodiment, the present invention can be an extension assembly for an existing pneumatic cutting tool. The extension assembly includes a connecting tube 20 (FIG. 1) having first and second ends, which the first end of the connecting tube 20 connected to the shaft 61 (FIG. 3). An extension rod 21 (FIG. 1) has ends 21a and 21b, where end 21a of the extension rod 21 is connected to the second end of the

connecting tube 20. The cylinder 30 has a body end 38 and an operating end 39, where the body end 38 is appropriately threaded for connection to the opening of the body 60 (FIG. 3), and the extension rod 21 is rotatably fitted into the cylinder 30 (FIG. 1). The connecting tube 67 (FIG. 3) with the positioning collar 68 is attached to end 21b (FIG. 1) of the extension rod, and the protective cover is attached to the operating end 39 of the cylinder 30. Finally, the bolt 72 (FIG. 3) is used to attach the circular cutter 71 to the connecting tube 67. The extension assembly can further include the adjustable handle assembly previously described.

While a particular embodiment of the pneumatic cutting tool adopted for two handed operation in accordance with the present invention has been shown and described, it will be appreciated by those skilled in the art that changes and modifications may be made thereto without departing from the invention in its broader aspects and as set forth in the following claims.

What is claimed is:

1. A cutting tool facilitating two handed operation, comprising:

a body having an opening defined therein;

a shaft rotatably mounted within said body;

a first connecting tube having first and second ends, said first end of said

5 first connecting tube being connected to said shaft;

an extension rod having first and second ends, said first end of said
extension rod being connected to said second end of said first connecting tube;

a cylinder having a body end and an operating end, said body end of said
cylinder being connected to said opening of said body, and said extension rod being
10 rotatably fitted into said cylinder;

a second connecting tube having first and second ends, said first end of said
second connecting tube being connected to said second end of said extension rod, and
said second end of said second connecting tube being connected to a positioning collar;
and

15 a circular cutter fitting onto said second connecting tube;

wherein said cylinder provides an elongated hand-grip facilitating two-
handed operation of the cutting tool, with one hand on said body and another hand on said
cylinder.

2. The cutting tool of claim 1, further comprising an adjustable handle

Fertilization treatments		Control		N		N + P		N + P + K	
Rate	kg/ha	Rate	kg/ha	Rate	kg/ha	Rate	kg/ha	Rate	kg/ha
Control	0	0	0	0	0	0	0	0	0
N	100	0	0	100	100	0	0	0	0
N + P	100	0	0	100	100	100	100	0	0
N + P + K	100	0	0	100	100	100	100	100	100

3. The cutting tool of claim 2, wherein said handle assembly includes

4. The cutting tool of claim 1, wherein said cylinder has a through hole

5. The cutting tool of claim 1, further comprising a pair of bearings

6. The cutting tool of claim 1, wherein said cylinder has an outer thread

7. The cutting tool of claim 6, wherein two facets are further defined

8. The cutting tool of claim 1, wherein two facets are further defined

9. The cutting tool of claim 1, further including a protecting cover fitted onto said operating end of said cylinder.

10. The cutting tool of claim 1, further comprising:
a protrusion part defined on a central part of said positioning collar; and
said protrusion part is connected to said circular cutter and has an inner thread to allow a bolt to screw therethrough and through a washer rendering said bolt to lock said washer to lock the circular cutter.

11. An extension assembly for a cutting tool having a body with an opening defined therein, a protective cover connected to the body, a shaft rotatably mounted within the body, a connecting tube attached to the shaft, a positioning collar attached to the connecting tube, and a circular cutter attached to the positioning collar, comprising:

a connecting tube having first and second ends, said first end of said connecting tube being connected to the shaft;

an extension rod having first and second ends, said first end of said extension rod being connected to said second end of said connecting tube; and

a cylinder having a body end and an operating end, said body end of said cylinder being connected to the opening of the body, and said extension rod being rotatably fitted into said cylinder;

wherein the connecting tube with the positioning collar is attached to said

second end of said extension rod, and the protective cover is attached to said operating
15 end of said cylinder.

12. The extension assembly of claim 11, further comprising an
adjustable handle assembly slidably mounted on said cylinder.

13. The extension assembly of claim 12, wherein said handle assembly
includes a rotatable tube mounted onto a periphery of said cylinder, and a threaded rod
operably connected to a handle.

14. The extension assembly of claim 11, wherein said cylinder has a
through hole defined therein for accommodating said connecting tube and said extension
rod.

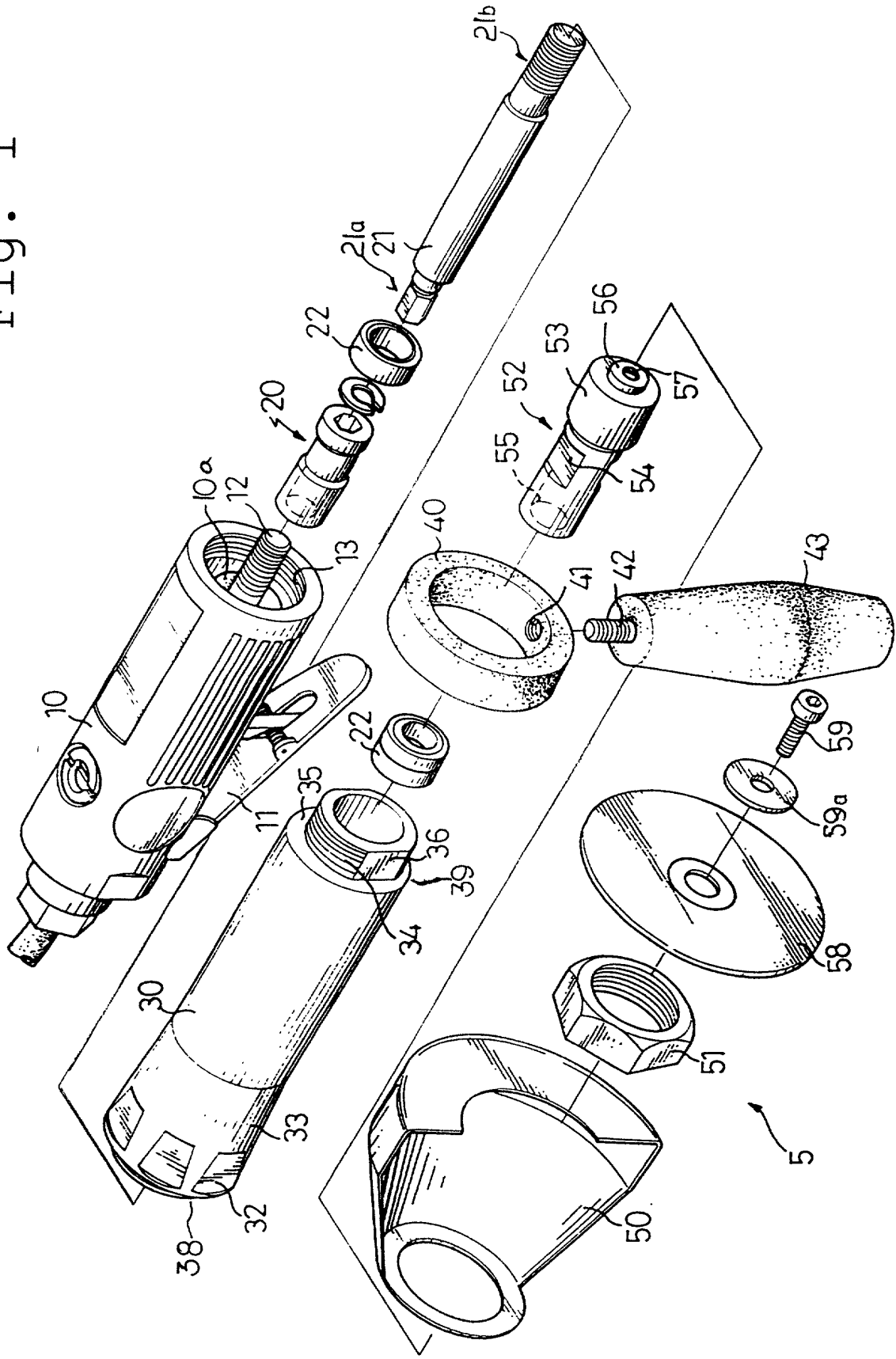
15. The extension assembly of claim 11, further comprising a pair of
bearings mounted to said first and second ends of said extension rod, and abutting said
cylinder.

ABSTRACT

A pneumatic cutting tool has an extended body length so it can be operated by a pair of hands to facilitate the operation and holding thereof. The body length can be increased using an extension cylinder and extension kit. The tool also has a handle mounted onto the periphery of the extended body length. The handle can be moved to any suitable axial and radial position on the body, and secured by tightening a threaded rod in the handle.

5

Fig. 1



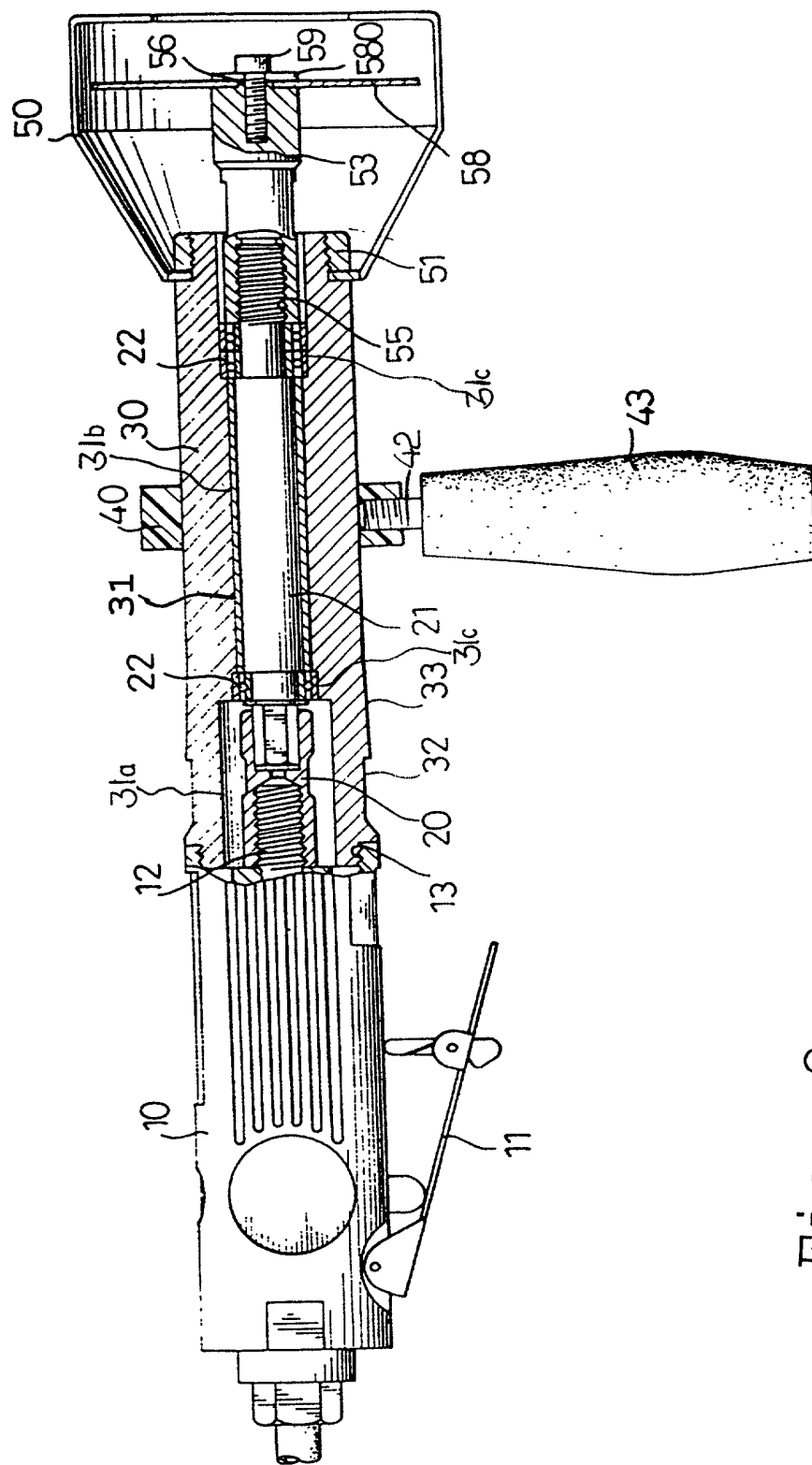
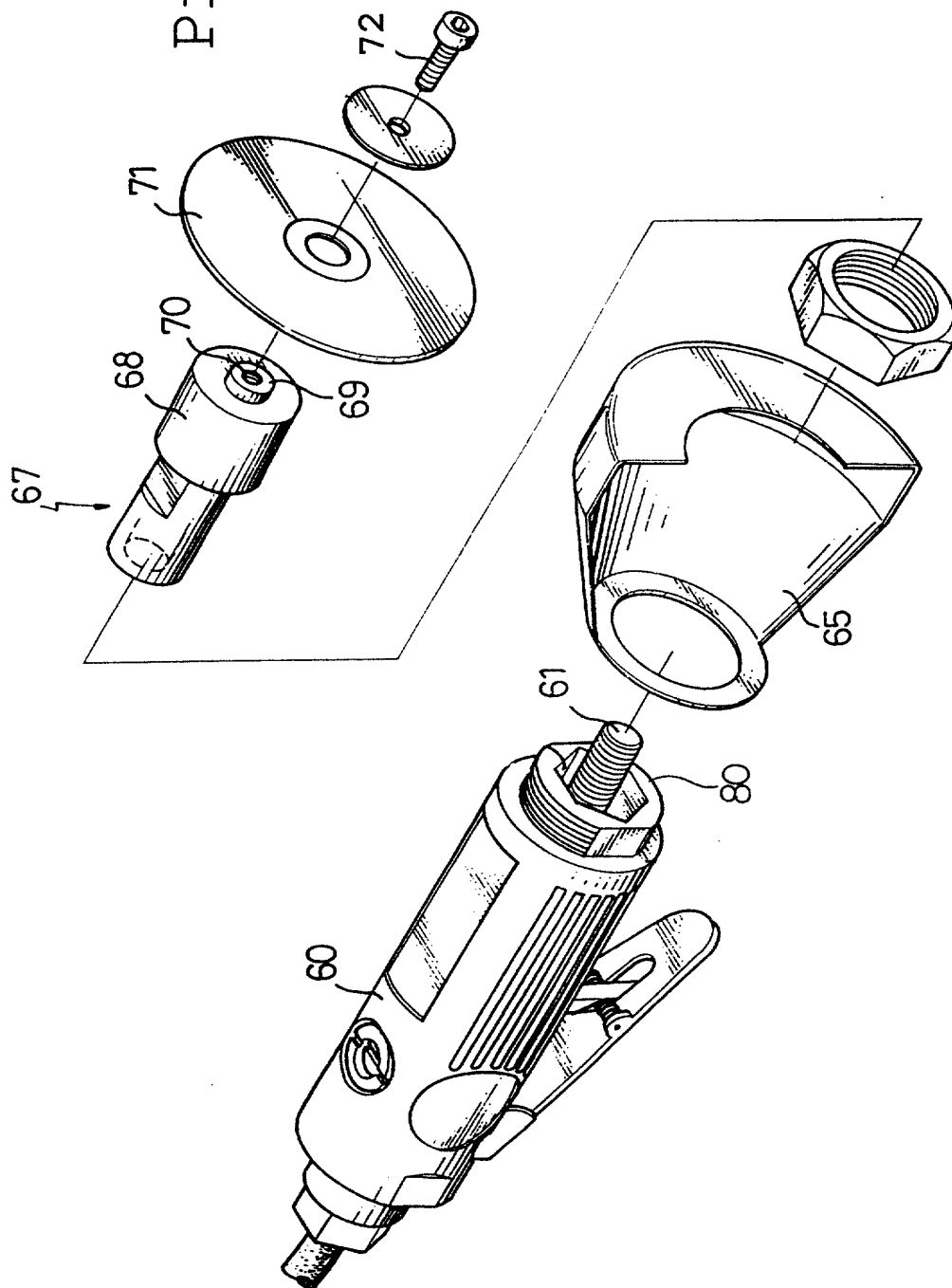


Fig. 2

Fig. 3
Prior Art



DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare:

That my residence, post office address and citizenship are as stated below next to my name:

That I verily believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Original: CUTTING TOOL ADOPTED FOR TWO HANDED OPERATION

the specification of which
(check one)

☒ is attached hereto.

☐ was filed on _____ as
Application Serial No.: _____
and was amended on _____
(if applicable)

That I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

That I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

That I hereby claim foreign priority benefits under Title 35, United States Code, §119 and §172 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed
089201440 (Number) No	Republic of China (Country)	27/ January/ 2000 (Day/Month/Year)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Yes
_____ (Number) No	_____ (Country)	_____ (Day/Month/Year)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Yes
_____ (Number) No	_____ (Country)	_____ (Day/Month/Year)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Yes

That I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

United States Application(s)

(Appl. Ser.No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Appl. Ser.No.)	(Filing Date)	(Status) (patented, pending, abandoned)

That all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

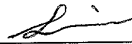
I hereby appoint the following attorneys, with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, and request that all correspondence and telephone calls in respect to this application be directed to GREER, BURNS & CRAIN, LTD., Suite 8660 - Sears Tower, 233 South Wacker Drive, Chicago, Illinois 60606, Telephone No. (312) 993-0080:

Attorney	Registration No.
Roger D. Greer	26,174
Patrick G. Burns	29,367
Lawrence J. Crain	31,497
Steven P. Fallon	35,132
James K. Folker	37,538
Jonathan D. Feuchtwang	41,017
B. Joe Kim	41,895
Joel H. Bootzin	42,343
Carole A. Mickelson	30,778 (Agent)

Full name of sole or one joint inventor:

Jian-Shiou Liaw

Inventor's signature:



Date:

Aug. 04, 2000

Residence and Post Office Address:

No. 51, Alley 83, Chung Ho Street

Tai Ping, Taichung,

Citizenship:

Taiwan

Address for Correspondence:

GREER, BURNS & CRAIN, LTD.
Suite 8660 - Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606